Jan. 1, 1963 W. FISCHER 3,071,261

MULTIPLE OPERATOR SORTING SYSTEM

Filed May 26, 1960 3 Sheets-Sheet 1

FIG. 1

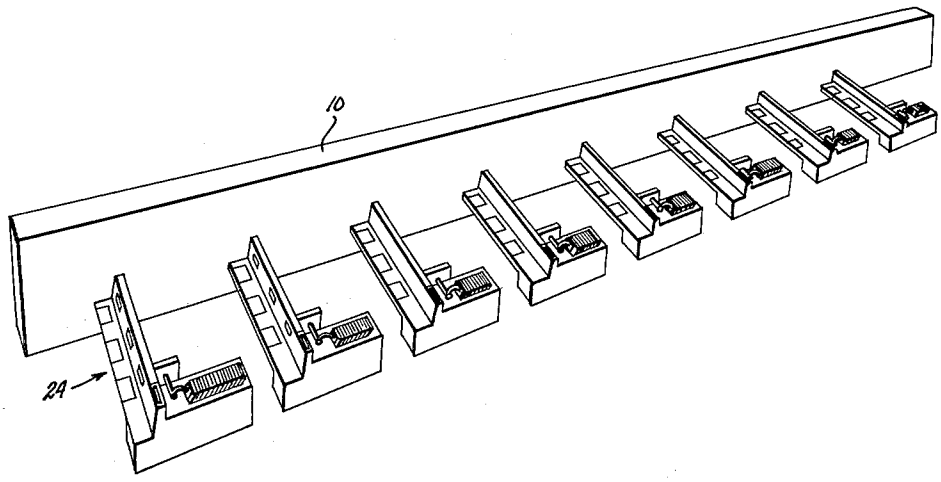

FIG. 3

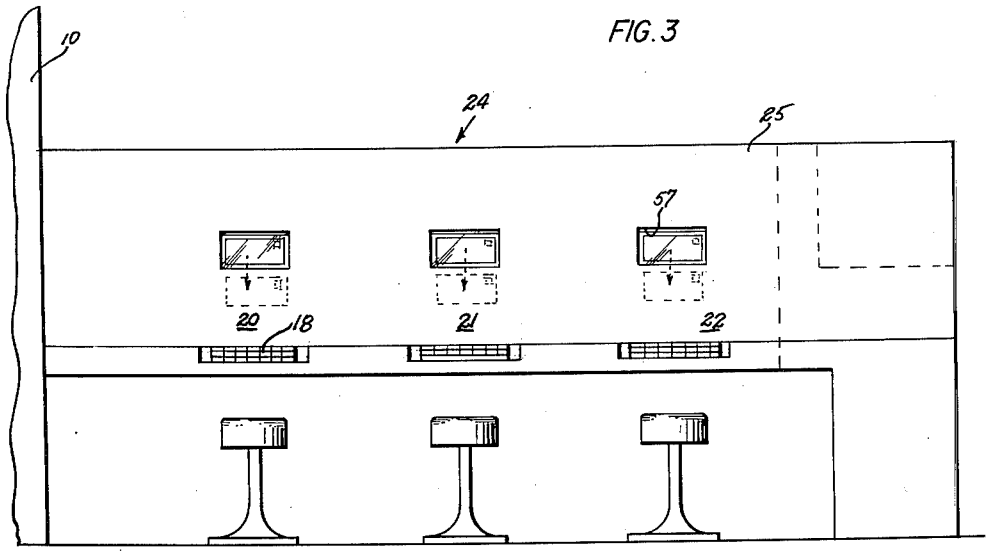

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FIG. 2

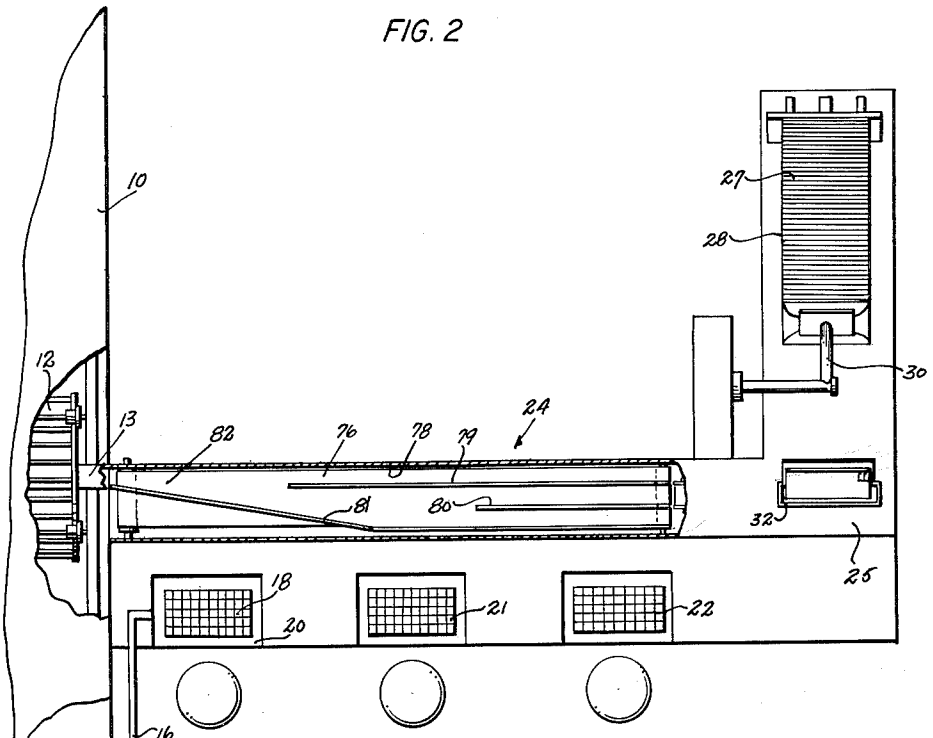


FIG. 6

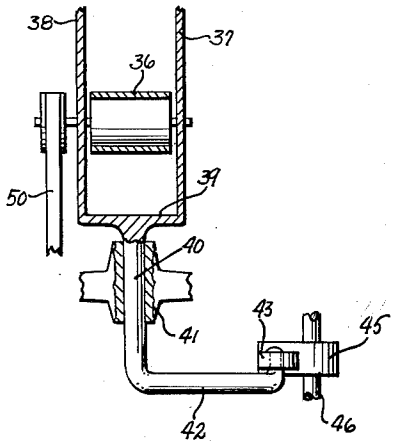
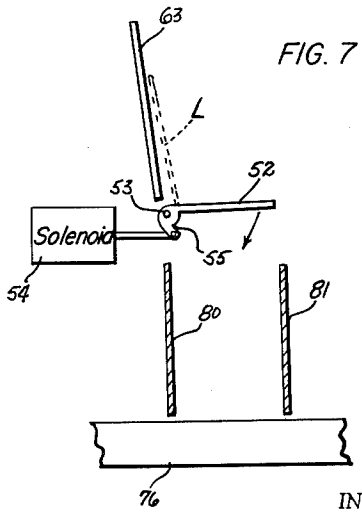


FIG. 7



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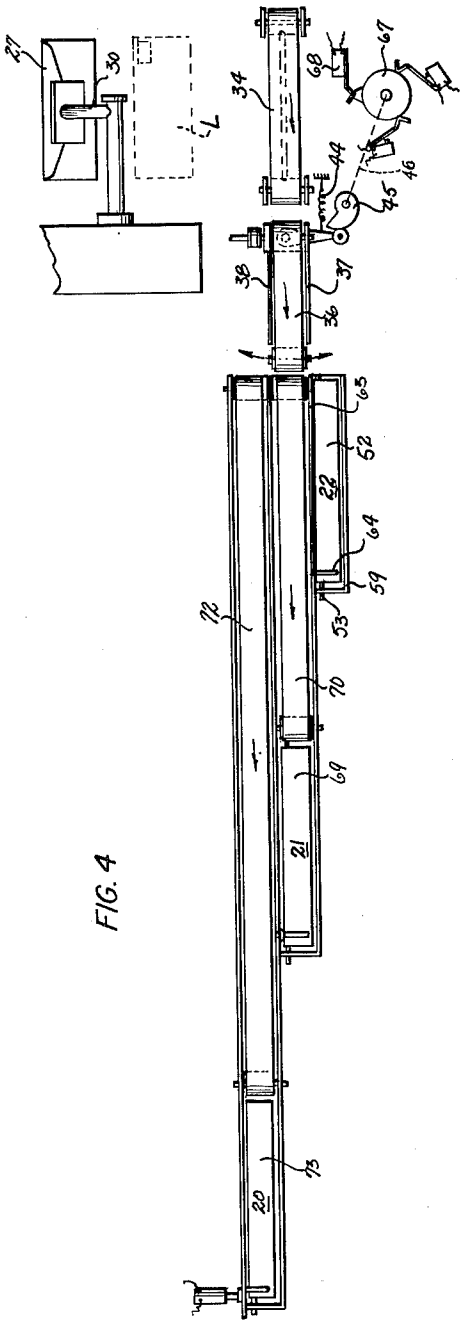

FIG. 4

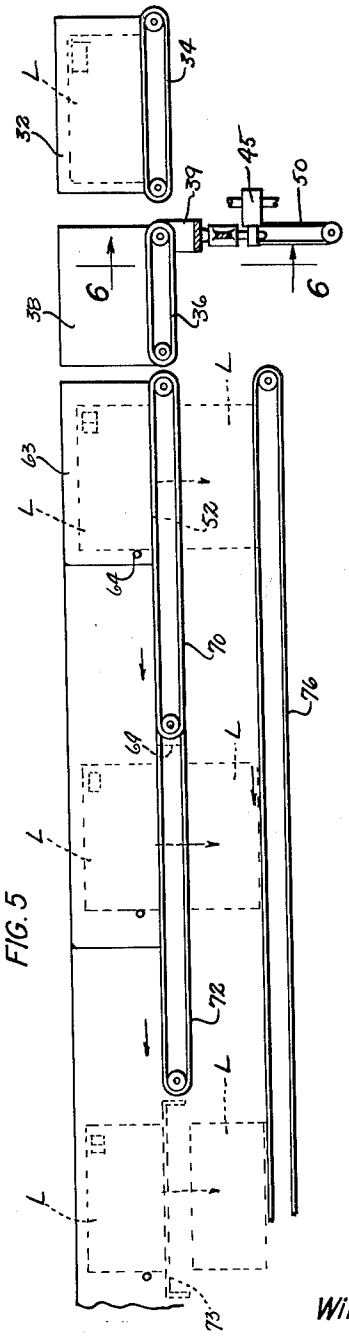

FIG. 5

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MULTIPLE OPERATOR SORTING SYSTEM

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Filed May 26, 1960, Ser. No. 32,003
4 Claims. (Cl. 214—11)

This invention relates to the art of sorting and/or coding, and more particularly to methods and apparatus for loading a sorting machine with the articles fed in timed relationship with the operation of the sorting machine and to methods and apparatus for coding.

Since the Rabinow et al. Patent No. 2,901,089, numerous improvements have been developed to enable machines such as the sorting machine disclosed in that patent, to function more effectively. At the outset, the present invention was devised as improved input equipment for the patented machine, but it is to be clearly understood that the principles of this invention apply in other environments and with other machines or equipment and for the handling of articles other than letter mail with which the patented machine principally deals.

Briefly, the features in the patented machine with which the present invention is concerned, are the coding device of the machine, referred to as the wheel setter, and the letter input device. Operating the machine disclosed in the Rabinow patent requires that the machine be coded or programmed by setting the coding device and inserting letters into proper pockets of moving receptacles in coordination with a particular code, and discharge of letters from the inserter.

My invention materially expedites the preliminary coding and inserting of the letters into a sorting machine. The capability of the machine for rapidly handling letters far exceeds a simple inserter and coding device disclosed in the Rabinow patent. Accordingly, an object of the invention is to provide apparatus and disclose methods for loading a sorting machine by using two or more reading stations and feeding the letters into the sorting machine at a single inlet. Of course, the apparatus may be duplicated any number of times, within practical limits determined by the size and speed of the sorting machine, but in each case the concept of multiple reading stations is preserved.

Another object of the invention is to provide unique structural arrangements for carrying out the preceding objective.

Another object of the invention is to disclose methods of loading machines with a single feeder, by the steps of individually feeding a number of letters to reading stations at which the destination information on the letters is read, for instance by a human operator or by a character reading machine, after which the human operator or character reading machine causes the coding device of the sorting machine, e.g., the previously mentioned patented sorting machine, to be adjusted in accordance with the destination information of the letters. And then, the letters are moved to the inserter of the sorting machine so that they may be applied in the machine in timed sequence with the operation and coding of the sorting machine.

Other objects and features of importance will become apparent in following the description of the methods and apparatus, one form of apparatus being shown in the accompanying drawings.

FIGURE 1 is a perspective view showing a diagrammatic representation of a sorting machine equipped with a number of multiple operator sorting apparatus showing the relationship thereof with the sorting machine.

FIGURE 2 is a diagrammatic top view showing the apparatus and its connection with a part of the sorting machine.

FIGURE 3 is a front elevational view of the apparatus shown in FIGURE 2.

FIGURE 4 is a top view showing the conveyor and doors which establish three reading stations of the apparatus.

FIGURE 5 is a side elevational view, also shown as a diagrammatic representation, this view showing the path of movement of a number of letters being processed by the apparatus.

FIGURE 6 is an enlarged sectional view taken on line 6—6 of FIGURE 5.

FIGURE 7 is a diagrammatic elevational view showing a detail of one of the doors at one of the reading stations.

FIGURES 1–3 show machine **10** which may be essentially identical to the machine disclosed in the Rabinow et al. Patent 2,901,089. However to emphasize that this is not essential, i.e., other sorting equipment may be used, drum inserter **12** (FIGURE 2) is illustrated in FIGURE 2 in place of the inserter shown in FIGURE 1 of the Rabinow patent. The drum inserter is described in detail in co-pending application U.S. Serial No. 28,648. Coding device **14** is schematically represented in FIGURE 2, and this coding device may be identical, similar, or quite different from the coding device identified as a wheel setter in the Rabinow patent. Electrical cable **16** extends from the coding device to a group of switches **18**, and these switches may be arranged to be operated by striking keys such as keys of a typewriter keyboard. Each reading station **20**, **21** and **22** is equipped with a group of switches **18**, and there is a suitable cable connection from the group of switches to the coding device. The cable contains electrical conductors to complete a circuit to operate the coding device in accordance with a particular key which is depressed.

Apparatus **24** is composed of a suitable frame contained within housing **25** and placed along side of machine **10**. A group **27** of letters is disposed on a feed table **28**, and a pickup device, for instance a pneumatic pickup **30** is connected with the frame of apparatus **24** and adapted to pick up individual letters from the group and place them into an inlet chute **32**. Pneumatic pickup devices are quite common and therefore no details are shown. For example, the pneumatic pickup device shown in Rabinow Patent 2,912,925 or in the F. Van Marle Patent 2,292,218 may be used.

Chute **32** is located above a continuously moving conveyor **34** (FIGURES 4 and 5), and conveyor **34** is operated at a sufficient speed to propel the letter L from the discharge end of conveyor **34** onto the inlet end of conveyor **36** located in tandem with conveyor **34**. The letters falling through chute **32** are simply gravity dropped onto conveyor **34** and then propelled onto conveyor **36** by the movement of conveyor **34**.

The conveyor **36** constitutes a part of a letter directing means to feed letters toward the three stations **20**, **21** and **22**. The letter propelling and directing means shown in the drawings consists of a guide established by a pair of side plates **37** and **38** attached to an upstanding yoke **39** having a spindle **40** which is mounted for oscillation in the bearing **41** (FIGURE 6). Spindle **40** has an arm **42** supporting a cam follower **43** in contact with a cam **45**. Spring **44** (FIGURE 4) keeps the follower **43** in contact with cam **45**. Cam **45** rotates with shaft **46** with which it is secured, and the rotation of shaft **46** is timed with the feeding of letters L by feed device **30**, by a gearing chain, or any other suitable transmission. The belt and pulley transmission **50** (FIGURE 6) is drivingly connected with conveyor **36** to operate this conveyor. This merely schematically represents one possible way of operating conveyor **36**, and it is understood that the same type of transmission may be used for all other

conveyors in apparatus 24 or other conventional conveyor drive transmissions may be adopted. It is evident from inspection of FIGURE 4 that the rotation of cam 45 will cause an oscillation of spindle 40 and a consequent movement of the letter conveying and directing means so that letters may be directed toward stations 22, 21 and 20.

Reading station 22 is established by door 52 (FIGURE 7) supported by spindle 53 or some other type of hinge. The door is capable of swinging down as shown by the arrow in FIGURE 7 and suitable means, for instance solenoid 54 having its armature attached to arm 55 of door 52, are provided to actuate the door. Door 52 is located behind an opening 57 in the front face of the apparatus housing 25, and this opening is disposed above the group of switches establishing the keyboard for station 22. Spindle 53 is rotatively carried by a part 59 of the frame of the machine, and one end of the door 52 is aligned with the discharge end of conveyor 36 when the conveyor is moved to one of its positions. Consequently, the inertia of the letter, obtained by the propulsive force of conveyor 36, moves the letter onto door 52. The frame of the machine has a wall 63 (FIGURE 7) behind door 52, and it is preferred that wall 63 be angled slightly from the vertical to assure that the letter will come to rest as shown in FIGURE 7 behind opening 57. A stop pin 64 attached to wall 63 and extending across door 52, prevents the letter from moving completely across door 52. FIGURE 7 shows door 52 at a slight angle to the horizontal as a further precaution requiring the letter L to come to rest at station 22 with the address and other information on the letter facing the operator at station 22. When the letter has remained at station 22 for a brief interval, the door 52 swings downward when the solenoid 54 becomes activated. Any number of systems may be adopted for activating solenoid 54, for example a cam 67 attached or driven by shaft 46 (FIGURE 4) may be caused to operate a switch 68 connected in circuit with solenoid 54.

Station 21 is established by a door 69 which is like the door 52, operated in the same manner and supported in the same way as door 52. The only distinction between the structure involved in stations 21 and 22 is the addition of conveyor 70 which is constituted in the same way as conveyor 34. It is in tandem with door 69, and the inlet of conveyor 70 receives letters from conveyor 36 when the letter directing and conveying means having conveyor 36, is aligned therewith as shown in FIGURE 4.

Station 20, again, is like the station 21, however, the three stations should be staggered if it is desired to keep the viewing positions for the operators in horizontal alignment. Conveyor 72 which is the same in function as conveyor 70, is longer than conveyor 70, and it feeds letters to door 73 which is identical to doors 69 and 52.

When the doors unload (FIGURE 5), the letters at the stations 22, 21 and 20 drop vertically onto a collecting conveyor 76 which runs beneath doors 52, 69 and 73 to feed conveyor 13 (FIGURE 2) for inserter 12. The conveyor 13 merely diagrammatically represents any suitable means for receiving letters from conveyor 76 and placing them in inserter 12.

A baffle system is structurally supported above the upper flight of the conveyor 76 (FIGURE 2). The baffle system consists of straight flat wall 78 along one edge of conveyor 76, and a shorter wall 79 laterally adjacent thereto. Wall 80 is parallel to and laterally adjacent to wall 79 but is shorter than wall 79. The final wall 81 is laterally spaced from wall 80, and the end thereof nearer to conveyor 13 is curved or directed toward wall 78 to define a comparatively narrow discharge throat 82. Door 52 is located above the space between walls 80 and 81; door 69 is located above the space between the walls 79 and 81; and door 73 is located above the space between walls 78 and 81. Therefore, when the letters are dropped from the doors of the three illustrated stations, they are momentarily in echelon, assuming that three letters drop at once, but as conveyor 76 operates, the letters are brought in tandem as they pass through throat 82.

In operation, letters are fed to conveyor 34 and propelled by that conveyor to the directing means and specifically, conveyor 36 thereof. The conveyor 36 oscillates in time with the rate of letter feed in order to direct letters to the three stations 22, 21 and 20. When a letter arrives at a station, an operator, for instance a human being, reads the information on the letter presented to view when the letter is momentarily at rest as shown in FIGURE 7. Then the destination information is relayed to the code device 14 by the operator depressing the proper key (closing a switch) to activate the coding device 14. Thereafter, or while the operator is actuating the switch at his or her station, the door at that station is swung to a letter releasing position.

The final step in my system is to convey the letters that drop from the stations 22, 21 and 20, to the inlet of machine 10, for instanse inserter 12. In so conveying the letters the relative positions of the letters from the various stations must be preserved, and conveyor 76 together with the baffle system shown best in FIGURE 2 accomplishes this objective.

Although the preceding description deals principally with feeding a machine with articles and adjusting the code device of the machine, this description is given by way of example only. My system embraces the concept of final sorting (as well as preliminary sorting) which would be the case if the output conveyor 13 led to receptacles, conveyors or any other device to the exclusion of machine 10. Furthermore, machine 10 could be substituted by any other type of compatible machine, as discussed below.

Rabinow Patent No. 2,912,925 discloses a code setting and printing machine. My system of multiple stations may be applied to this or analogous machines, producing the interesting result that the combination enables my system to function as a coding apparatus. In addition it is immaterial whether the printing on the articles is visual, magnetic or both.

The invention exemplified by machine 24 can be considered as having an article output at conveyor 13 and an information signal output at cable 15. Either or both outputs may be used in a great number of capacities, only some of which can be mentioned. Numerous other changes may be made without departng from the protection of the following claims.

I claim:

1. Apparatus to arrange and feed articles comprising a frame, means including a door and timed means to operate said door for establishing a first reading station, means including a door and timed means to actuate the same for establishing a second reading station, means including a conveyor carried by said frame to sequentially feed said stations, the last-mentioned means including a mechanism to displace said conveyor to alternate positions of registry with said stations establishing means, means secured to said frame adjacent to said stations for collecting the articles temporarily at said stations and preserving the order of receipt of said articles for conveying the articles to a discharge outlet, said collecting and order-preserving means including an article collection conveyor, a baffle system adjacent to said collection conveyor, and portions of said baffle system arranged to be fed by articles discharged by operation of said doors.

2. The apparatus of claim 1 wherein said articles are letters, and a stop at each reading station for the letters that enter said stations.

3. Apparatus to arrange and feed articles comprising a frame, means including a door and timed means to operate said door for establishing a first reading station, means including a second door and timed means to actuate said second door for establishing a second reading

station, an upstanding wall adjacent to each door to partially support the articles while they are on the doors of said reading stations, means including a conveyor movably connected with said frame to sequentially feed articles to said stations, the last mentioned means including a mechanism to displace said conveyor to alternate positions of registry with said stations establishing means, said timed means operatively connected for actuation in time with said mechanism, means including an article collection conveyor located below said doors for collecting the articles temporarily at said stations and preserving the order of receipt of said articles at said stations, a baffle system between said station doors and said collection conveyor to guide the articles dropped from said stations as they fall onto said collection conveyor, and portions of said baffle system arranged to be fed by articles discharged from said stations by operation of said doors.

4. The apparatus of claim 3 wherein the articles are letters, and said doors are approximately horizontal when

in the station-closing position, said upstanding walls adjacent to said doors being tilted rearwardly so that a letter in a station rests by its lower edge on the station door and leans against the wall, and stops at said stations to form abutments for the letters as they enter said stations.

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